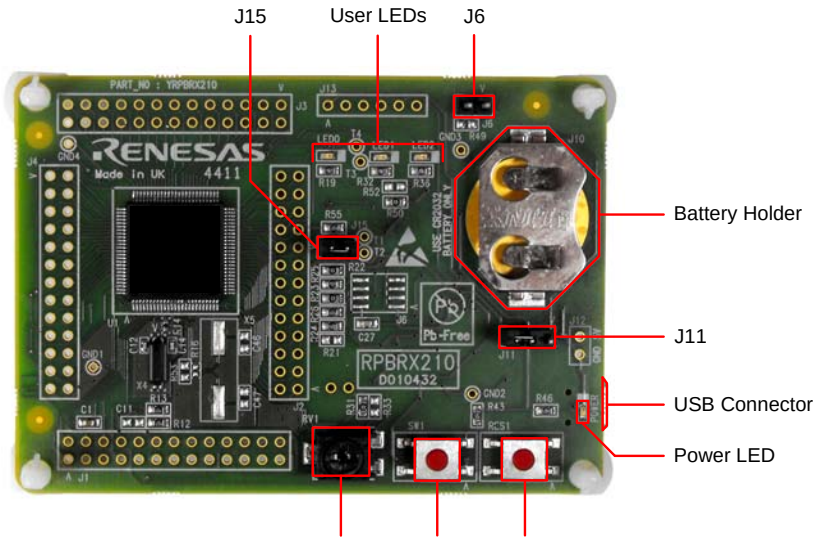
Quick Start

Renesas Promotional Board For RX210



1. Installation

<u>You can run the installation first, or come back and run it later if you wish to use the pre-programmed on-board demo. However, if the USB driver is not automatically installed after connecting to the RPB you will need to perform the installation before proceeding.</u>

The installer will install all of the tools for your Renesas Promotional Board.

1. Insert the mini CD into your computer's CD-ROM drive. The CD should automatically run the installation program. If the installer does not start, browse to the CD root folder and double click on 'setup.exe'.
2. Windows™ Vista users may see "User Account Control" dialog box. If applicable, enter the administrator password. Click <OK>
3. Follow the on-screen instructions until the installation is completed.

   Note: The Windows driver signing dialog box may be displayed. Please accept the driver to continue.
4. Note that the first time the board is connected to each USB port, J-Link will install its driver automatically and Vista users may need to enter an administrator password during this process.
5. Note that these demonstration programs support little endian configuration.

2. Initial board configuration and connection for the pre-programmed on-board demonstration

J6 (fitted): MCU Power. Although this jumper is fitted by default, it can be replaced with an ammeter to measure the CPU current.

J11 (2-3): Power Source Select. By default, this will be connected between pins 2 and 3 to select USB power.

J15 (fitted): Debugger Disable. The RPBRX210 includes a debugger circuit that can be used to program and debug the RX210 but this circuit is disabled byJ15 by default to allow execution of the the pre-programmed on-board demonstration. In this configuration, the USB connection will not support debugging and will instead just be used to power the board.

The board is pre-programmed with the in the Low Power Demonstration program.

For running the code (including the the pre-programmed on-board demonstration) without debugging:

6. Ensure that the J15 jumper is fitted to disable the debugger circuit.
7. Ensure that the J11 jumper is fitted between pins 2 and 3 to enable USB as the power source.
8. Either ensure that the J6 jumper is fitted, or remove the jumper from J6 and connect an ammeter to measure the MCU current.
9. Plug in the USB cable between the PC and the RPB to power the board and execute the pre-programmed demo code. Note that the USB connector is on the underside of the board. The power LED indicator should light and the code will begin execution, see section 3 for instructions for operation of the demonstration program.

3. LowPowerDemo program operation

The RPB uses three LEDs for visual output and a switch and potentiometer for the control input. The user interface for configuring the tutorial code is via a "menu" system where the options are adjusted using the potentiometer, displayed in binary on the LEDs, and selected using SW1. More detail on the available settings can be found in the appendix.

Using the demo:

10. Before the main menu selection, the LEDs will firstly display a moving pattern for a couple of seconds to identify that this is the first menu.
11. When this is complete, the user can select a value from 0 to 7 with the potentiometer. As the potentiometer is adjusted, the corresponding value will be displayed in binary on the LEDs. Note that LED0 is the least significant bit but is on the left side of the RPB.
12. The options that can be selected from the main menu are as follows, and selection is made with a short press of switch SW1. LED0 will then flash the appropriate number of times to confirm the selection.

Main Menu Options				
Value	Name	LED0 (lsb)	LED1	LED2 (msb)
0	RTC_MENU	0	0	0
1	SUB_32k	1	0	0
2	LOCO_125k	0	1	0
3	HOCO_1M	1	1	0
4	HOCO_50M	0	0	1
5	SW_SLEEP	1	0	1
6	SW_STBY	0	1	1
7	SW_DP_STBY	1	1	1

13. Only if option 0 was selected, then the next menu selection is for the RTC options. Again the selection is made with the potentiometer and Switch SW1. The options are shown to the right. After the RTC menu selection, operation will return to step 10.

    *For Output RTC, the hours, minutes and seconds value will be indicated by flashes on LED0, LED1 and LED2 respectively.

RTC Menu Options				
Value	Name	LED0 (lsb)	LED1	LED2 (msb)
1	Output RTC*	1	0	0
2	Reset RTC	0	1	0
3	Start RTC	1	1	0
4	Stop RTC	0	0	1

3. Demonstration program operation (Cont)

14. If a value between 1 and 7 was selected from the main menu, then the user must next select the CPU load option with the potentiometer and SW1 in the same way. Upon selection with SW1, LED1 will flash the appropriate number of times to confirm the selected value:

CPU Load Menu Options				
Value	Name	LED0 (lsb)	LED1	LED2 (msb)
1	CPU_MIN	1	0	0
2	CPU_TYP	0	1	0
3	CPU_MAX	1	1	0

15. The MCU now enters a full power loop in the selected mode. Current measurements can be taken across J6 at this point. Note that changing the ammeter range may interrupt the power to the CPU, causing a reset or strange behaviour.
16. Pressing SW1 will put the CPU into the selected low power mode and again current measurements can be taken across J6.
17. To exit the low power mode and restart, press the RES1 switch.

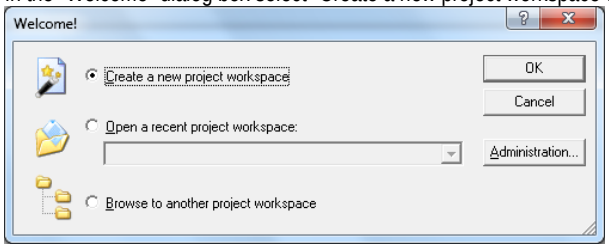
4. Debugger operation and the HEW Workspace

Once you have tested the pre-programmed demonstration, it is time to connect to the board and write some code.

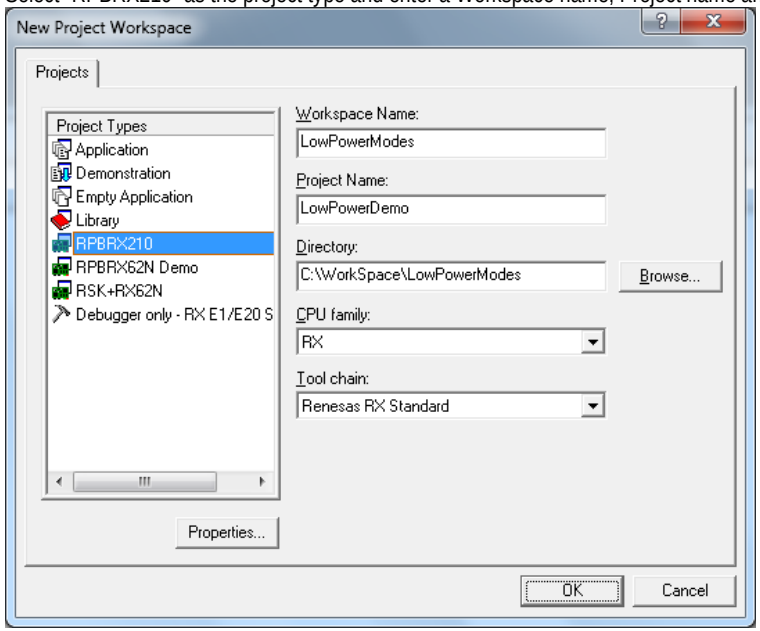
High-performance Embedded Workshop (HEW) integrates various tools such as compiler, assembler, debugger and editor into a common graphical user interface.

The workspace supplied is set to automatically connect to the on-board Segger J-Link debugger circuit (located on the underside of the RPB).

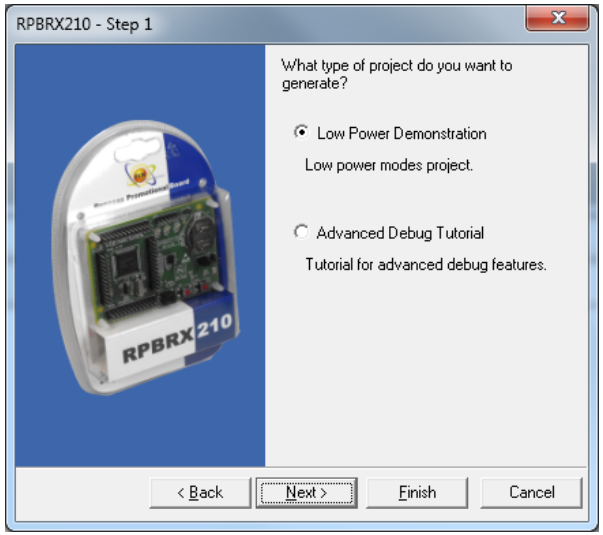
18. To program or debug, you must enable the debugger circuit by removing J15.
19. Connect the RPB's underside USB connector to a spare USB socket on the PC.
20. Note that the first time it is connected here, J-Link will install its driver automatically.
    Note: Windows Vista users may need to enter an administrator password during this process.
21. Launch HEW from the Start Menu. (Start Menu > All Programs > Renesas > High-performance Embedded Workshop).
22. In the "Welcome" dialog box select "Create a new project workspace". Click <OK>



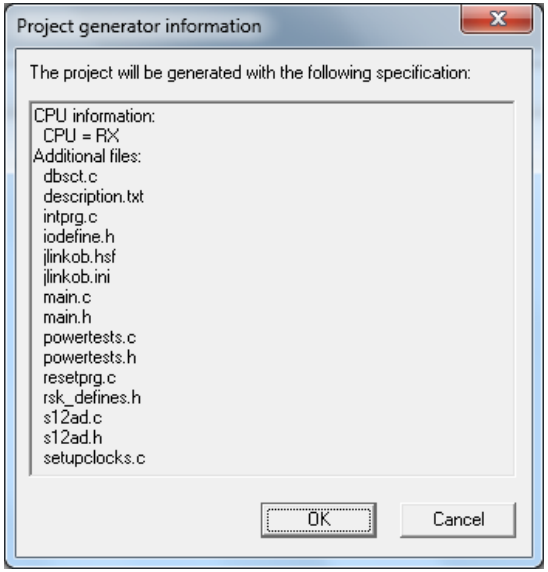
23. Select "RPBRX210" as the project type and enter a Workspace name, Project name and directory. Click OK.



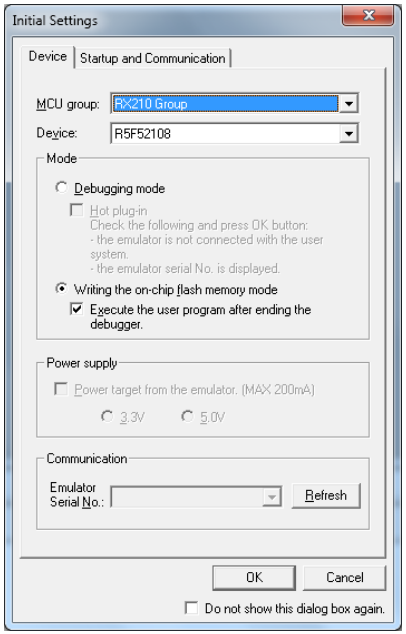
24. Select "Low Power Demonstration" to create the project used for the preprogrammed sample code. Click Finish.



25. Click OK to dismiss the Project Generator Information dialog.



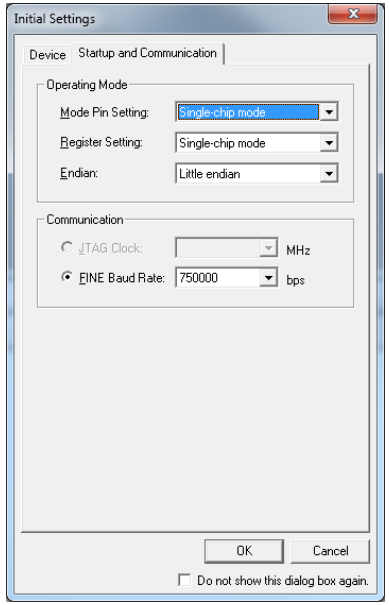
26. Select [Debug->Connect]
27. To reprogram the LowPowerDemo into the flash, select “Writing the on-chip flash memory mode” to program the device (recommended for current measurement) or “Debugging mode” to debug.



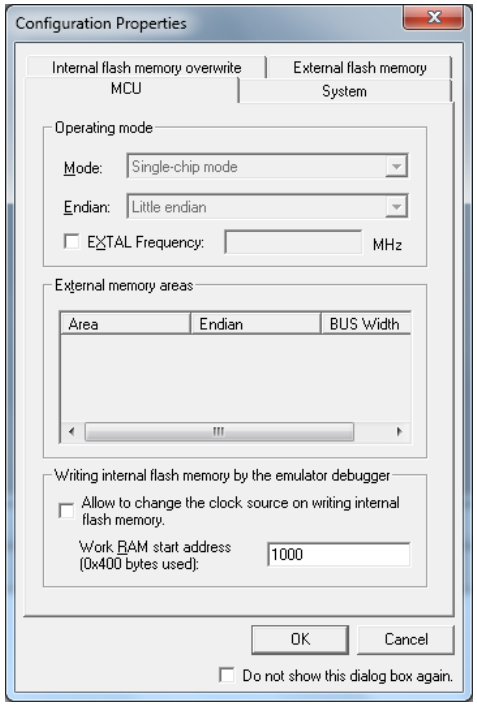
28. On the Startup and Communication Tab, select:

Mode Pin Settings:	Single-chip Mode
Register Setting:	Single-chip Mode
Endian:	Little Endian
FINE Baud Rate:	750000 bps

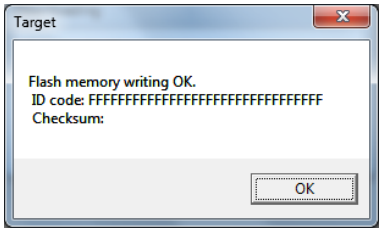
29. Click <OK>.



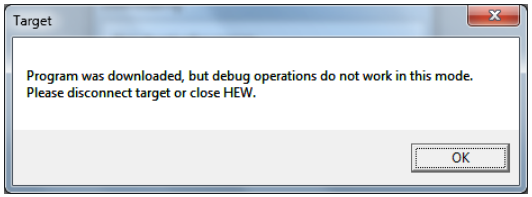
30. The debugger will now try to connect. If the connection fails here, check that the jumper settings are correct and that the power LED is lit.
31. Dismiss the Configuration Properties dialog using the OK button



32. Using the powerful features of HEW you will be able to view, edit and build the workspace. If “Writing the on-chip flash memory mode” was selected above then debugging is not possible.
33. If “Debugging mode” was selected instead then debugging is now possible except in the low power modes (where the comms will be dropped and HEW will display error messages when trying to access registers or perform other operations). Note that the MCU current will be much greater if the debugger connection is active – for current measurement, please select “Writing the on-chip flash memory mode”.
34. Press F7 to build the code.
35. Right click on the download module and select “Download” to download it.
36. If the download module includes data in the ID code area, an information dialog will be displayed.



37. If Writing to Flash, the following dialog will be displayed:

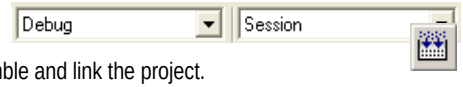


Click OK to dismiss it.

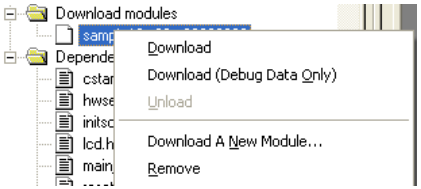
38. Select [Debug->Disconnect] to disconnect.

5. The Main HEW Controls

39. There are two pull-downs to select the Build Configuration and Session.



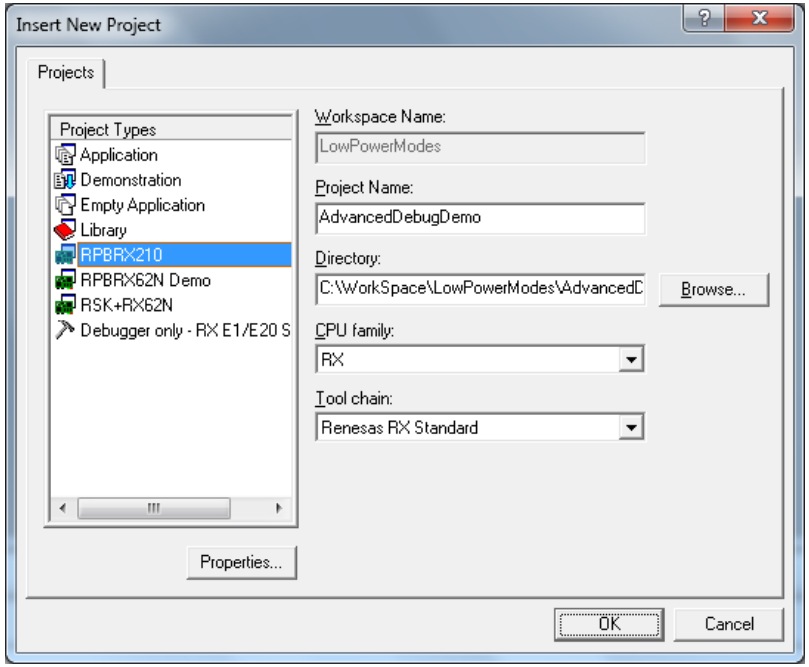
40. The ‘Build’ icon is the command to compile, assemble and link the project.
41. The “Connect” icon is used to reconnect to the debugger, use the same settings as before (although on subsequent connections the dialog boxes are slightly different format than the first time).
42. You can download to the target by right clicking on the “Download module” and selecting Download.



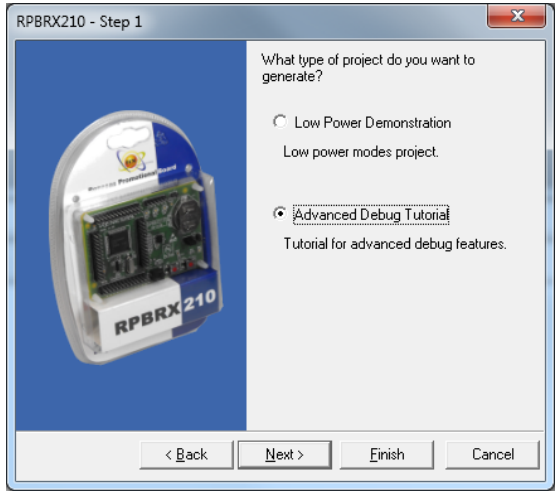
To learn more about using HEW, open the HEW User Manual installed on your computer (Start Menu > All Programs > Renesas > High-performance Embedded Workshop > Manual Navigator).

6. AdvancedDebugDemo_RX program operation

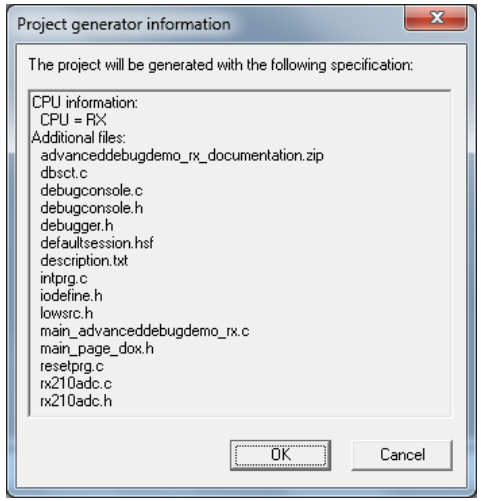
43. Either create a new workspace as in step 21, or to insert into an existing workspace select [Project->Insert Project], New project.
44. Select “RPBRX210” as the project type and enter a Project name and directory. Click OK.



45. Select Advanced Debug Tutorial, Click Finish.

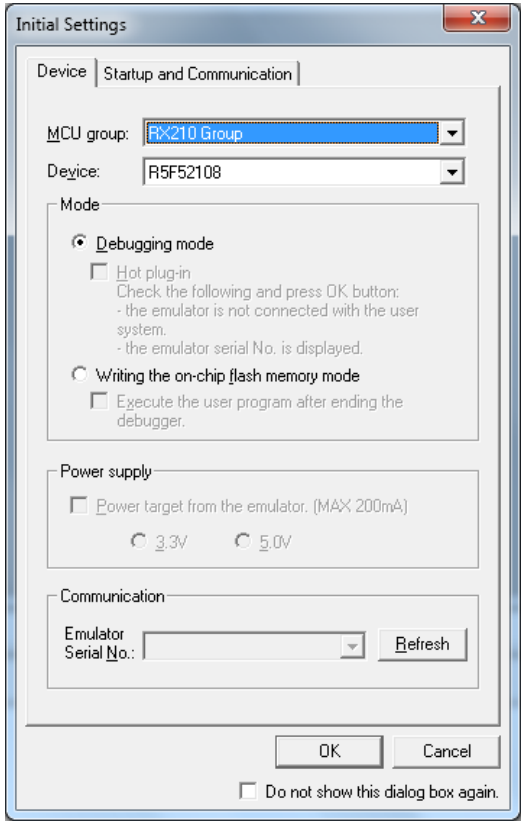


46. Click OK to dismiss the Project Generator Information dialog.

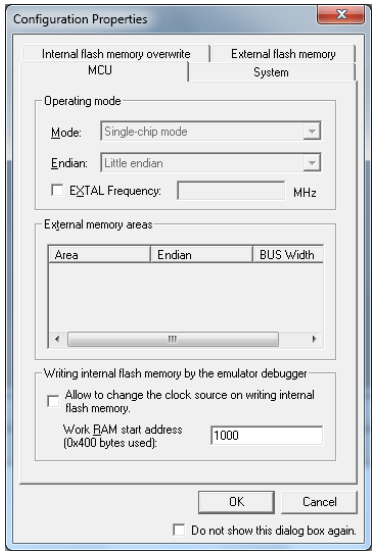


47. Adjust the jumpers to allow debugging:
    a. Remove the jumper on J15 to enable the debugger circuit.
    b. Fit the jumper to J6.
    c. Set the J11 jumper to 2-3 to power from USB.
48. Insert the USB cable.
49. Connect to the device using the [Debug->Connect] menu item.

50. Ensure that Debugging Mode is selected, Click OK.



51. Dismiss the Configuration Properties dialog using the OK button.



52. Enable the Debug Console Window in HEW using the [View->CPU->DebugConsole] menu. Adjust its size appropriately for your screen size.
53. Build the code by pressing F7.
54. Right click on the download module and select “Download” to download it.
55. Select [Debug->Reset Go].
56. Follow the on screen instructions in the Debug Console window. (PowerON_Reset() calls the main() function, which displays a menu in the Debug Console).
57. Advanced debug features can be demonstrated by selecting the appropriate menu item using the keyboard to type a character into the Debug Console window in HEW.
58. The Debug Console will be used to display a menu of walkthrough demonstrations. The menu selection is made from the PC side by typing into the Debug Console, and on-screen instructions are printed to the Debug Console window.
59. Note that the full documentation (and Doxygen configuration files) can be found in the AdvancedDebugDemo_RX_Documentation.zip file in the project directory. A Compiled HTML Help file is also included in the Documentation\html directory.

7. Renesas RX Compiler

The version of the compiler provided with this RPB is fully functional but time limited. You have 60 days to evaluate the full product before the compiler will limit the code linker to 128k bytes. Full licensed RX compiler versions are available from your Renesas supplier.

8. Support

Online technical support and information is available at: www.renesas.com

Technical Contact Details

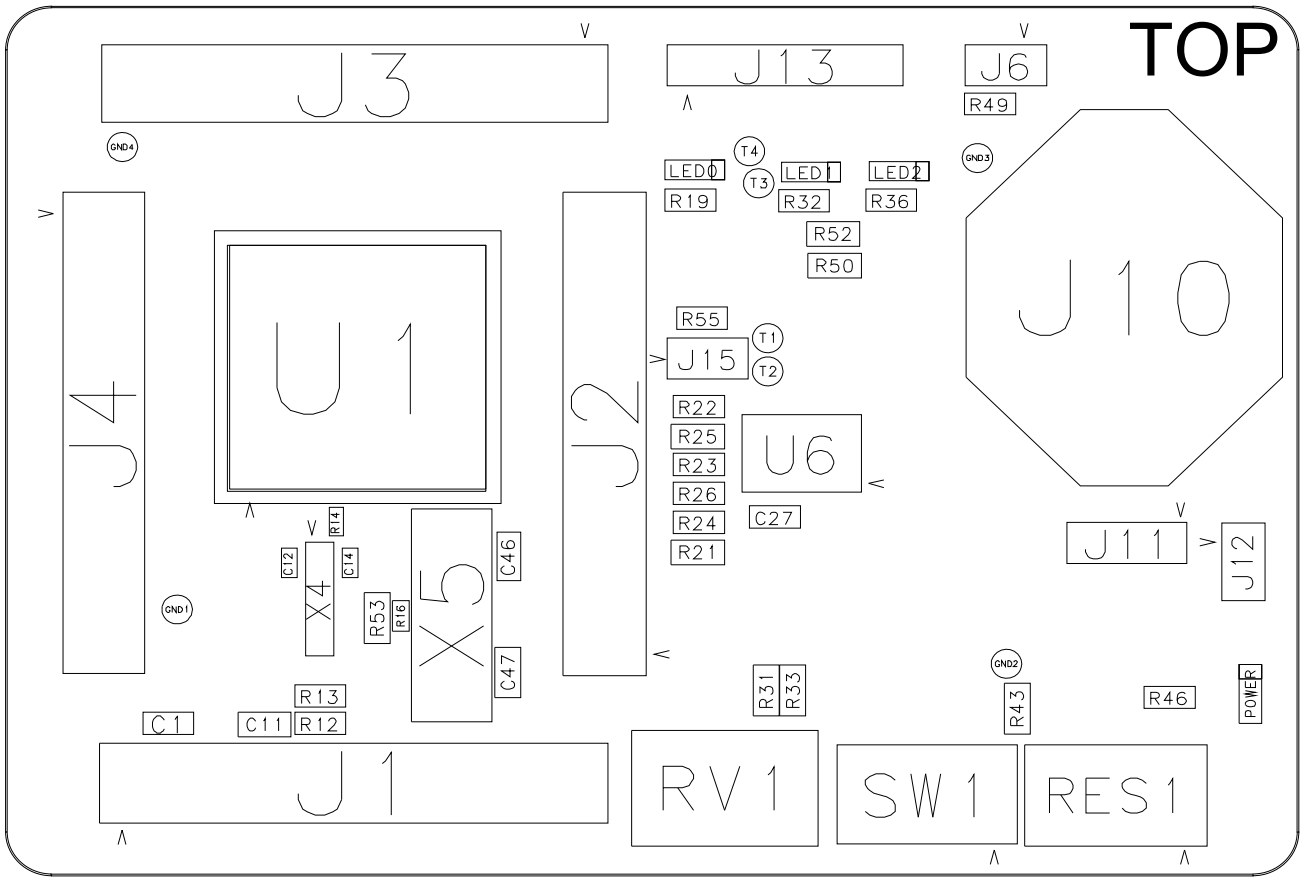
America:	techsupport.america@renesas.com
Europe:	tools.support.eu@renesas.com
Japan:	csc@renesas.com

Note on AutoUpdate: This is configured to automatically add itself to the Startup folder in the Windows Start Menu and use the registry defaults for access to the web. After restarting the machine an icon will appear in the System Tray next to the clock. To change the settings or access AutoUpdate, simply right click on the icon and use the menu that appears.

9. References

The board and sample code supplied with this product were designed with the rev. 0.90 RX210 Group Hardware Manual (R01UH0037EJ).

The component placement diagram has been included on the next page.


TOP
J3
J13
J6
R49
GND4
LED0
LED1
LED2
T4
T3
R19
R32
R36
R52
R50
GND3
J10
J4
U1
J2
R55
J15
T1
T2
R22
R25
R23
R26
R24
R21
U6
C27
R14
C12
C14
X4
X5
C46
C47
R53
R16
GND1
J11
J12
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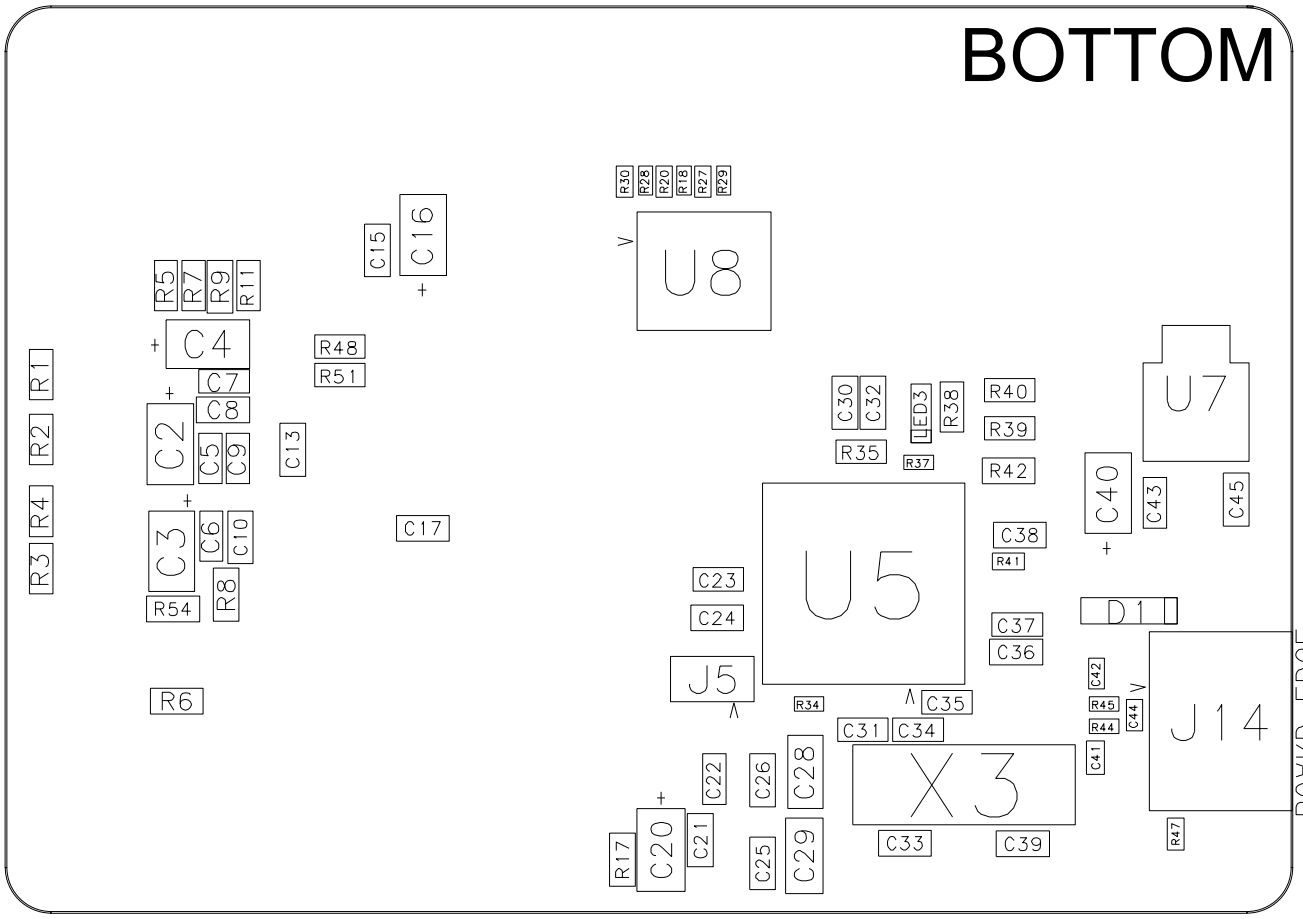
C11
R12
R31
R33
GND2
R43
R46
POWER
J1
RV1
SW1
RES1


BOTTOM
R30
R28
R20
R18
R27
R29
U8
C15
C16
R5
R7
R9
R11
C4
R48
R51
C7
C8
C2
C5
C9
C13
R1
R2
R3
R4
C3
C6
C10
C17
R8
R54
R6
C30
C32
LED3
R38
R40
R39
R35
R37
R42
U7
C40
C43
C45
C38
R41
U5
C23
C24
J5
D1
C37
C36
R34
C35
C31
C34
C42
R45
R44
C44
C41
J14
X3
C22
C26
C28
C21
C25
C29
C33
C39
R17
C20
R47
BOARD EDGE